

39. (New) The method of displaying an image of claim 35 wherein the matrix liquid crystal display is an active matrix liquid crystal display having a plurality of pixel electrodes, and a layer of liquid crystal between the pixel electrodes and the counterelectrode.
40. (New) The method of displaying an image of claim 39 wherein the clearing the image from the display comprises initializing the pixel electrodes to a set voltage.
41. (New) The method of displaying an image of claim 40 wherein the flashing ends a set time period after the initializing the pixel electrodes to a set voltage.
42. (New) The method of displaying an image of claim 35 wherein the flashing ends a set time period after varying the counterelectrode.
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amended

REMARKS

Claims 1-18 are pending in the application. All claims stand rejected. In response, certain claims have been amended and new claims have been added (Claims 19-42) to more distinctly claim the applicants' invention. Rejections are also traversed. Support for the amendments and the new claims 19-34 is found at least on specification page 14, lines 8-15. Reconsideration and further examination are requested.

Claim Rejection Under § 112

Claim 18 has been rejected under 35 U.S.C. § 112, second paragraph. As amended, claim 1 does not require a particular order for clearing the image and flashing the light source. Accordingly, flashing the light source can occur before clearing the image, as stated in amended claim 18.

Thus, amended claim 18 particularly points out and distinctly claims the subject matter which the applicants' regard as the invention. The § 112 rejection of claim 18 is therefore believed to be overcome.

Claim Rejections Under § 102(b)

Claims 1-7 and 12-13 stand rejected under 35 U.S.C. 102(b) based on U.S. 5,337,068 to Stewart et al.

Stewart describes a display formed by placing an array of liquid crystal devices (LCDs) over a bank of red, green, and blue fluorescent lamps. The display is operated to generate separate red, green, and blue images with the respective lamps, such that flashing of the red, green, and blue images is perceived as a color image. The array of LCDs includes a layer of liquid crystal material (234) sandwiched between two plates (228) and (230). The side of the plate (228) which is closest to the liquid crystal material (234) is covered with a transparent conductive coating, and the side of the plate (230) which is closest to the liquid crystal material is covered with a matrix (236) that forms the active electrical portion of the display. The matrix (236) includes an array of transparent conductive plates (258), one for each pixel position in the display.

However, Stewart's description of the device and the operation of the device says nothing about the number of pixel electrodes in the display nor the active area of the display. The description is specifically directed to using the display to produce multi-color images without consideration for the size of the display.

By way of contrast, the applicants' state that images are written on a display with at least 75,000 pixel electrodes, and that each pixel electrode can have a width of less than about 15 microns. Without considering a display with such features, Stewart does not teach nor is there any motivation to suggest "writing an image to a matrix liquid crystal display having an array of at least 75,000 pixel electrodes and an active area of less than 20 mm²," as required by amended claim 1, nor "setting a voltage to each of at least 75,000 pixel electrodes of an active matrix crystal display with an active area of less than 20 mm²," as recited in amended claim 12. Among other advantages of applicants' invention, by reducing the size of the display, a larger number of displays can be fabricated from a single wafer. Hence, the manufacturing yield can be substantially increased and the cost per display can be substantially reduced. Furthermore, the display is lighter and more compact, and thus more portable.

Thus, the applicants' invention described in amended claims 1 and 12 is not anticipated by Stewart, and therefore the rejections of claims 1 and 12 are overcome. Because claims 2-7, and 13 depend from claims 1 or 12, the reasons for allowance of claims 1 and 12 apply as well to these dependent claims.

Reconsideration of the rejections under 35 U.S.C. § 102(b) is respectfully requested.

Claim Rejections Under § 103(a)

Claim 15 stands rejected under 35 U.S.C. 103(a) based on Stewart. Claims 14 and 16-17 stand rejected based on Stewart in view of U.S. 4,917,469 to Ross. And claims 8-11 stand rejected based on Stewart in view of U.S. 6,151,004 to Kaneko. This rejection is traversed.

The applicants first note that Kaneko is not prior art. Kaneko has a § 102(e) date of April 16, 1998 and a PCT publication date of February 26, 1998. The critical date, therefore, is April 16, 1998. The applicants' claims 8-11 are entitled to a priority date that predates April 16, 1998. Accordingly, Kaneko is disqualified as prior art.

Again, Stewart discloses a display formed from an array of liquid crystal devices. And the Office Action cites Ross as teaching a LCD device with a sensor for sensing the liquid crystal.

However, the references do not describe a display or the use of a display having a particular number of pixel electrodes or the active area of the pixel electrodes. Furthermore, the references say nothing about displaying images on pixel electrodes with a particular size. Accordingly, the references, alone or in combination, do not teach displays with small active areas.

On the other hand, as stated above, the applicants describe displaying images on a display with a particular number of pixel electrodes and the size of the individual pixel electrodes. Specifically, amended claim 10 requires writing an image to a display by "setting a voltage to each of at least 75,000 pixel electrodes of an active matrix liquid crystal display with an active area of less than 20 mm²." Accordingly, in contrast to the references cited in the Office Action, the applicants' invention has the advantageous feature of generating images on displays with very small active areas. As mentioned previously, a larger number of displays can be fabricated from a single wafer when the size of the display is reduced. This results in a higher manufacturing yield and consequent reduction in the cost per display. In addition, the display is lighter and more compact, and thus more portable.

Thus, Stewart, alone or in combination with Ross, does not make obvious the invention described in amended claim 10. The rejection of claim 10 is therefore overcome.

Because claims 8-11 and 13-17 depend from claims 1, 10, or 12, the reasons for allowance of claims 1, 10, and 12 apply as well to these dependent claims.

Reconsideration of the rejections under 35 U.S.C. § 103(a) is respectfully requested.

New Claims

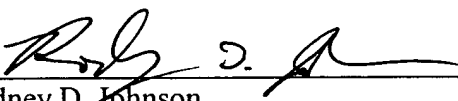
New Claims 19-42 have been added to the application. New independent claim 35 recites subject matter of previous claims 1 and 8.

CONCLUSION

In view of the above amendments and remarks, it is believed that all pending claims (Claims 1-42) are in condition for allowance, and it is respectfully requested that the application be passed to issue. If the Examiner feels that a telephone conference would expedite prosecution of this case, the Examiner is invited to call the undersigned attorney at (978) 341-0036.

Respectfully submitted,

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MARKED UP VERSION OF AMENDMENTS

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Claim Amendments Under 37 C.F.R. § 1.121(c)(1)(ii)

1. (Amended) A method of displaying an image sequence comprising:
 defining a first image;
 writing [an] the image to [the] a matrix liquid crystal display having an array of at least 75,000 pixel electrodes and an active area of less than 20 mm²;
 clearing the image from the display;
 flashing a light source; and
 repeating the [steps of] writing, clearing and flashing to produce a second image.
2. (Amended) The method of displaying an image of claim 1 further comprising [the steps of] allowing the liquid crystal [image] to rotate towards an equilibrium prior to flashing the light source.
3. (Amended) The method of displaying an image of claim 2 wherein the flashing [of] the light source ends before the writing of the next image.
4. (Amended) The method of displaying an image of claim 2 wherein the flashing [of] the light source continues for a specific time period [of the] during the writing of the next image.
5. (Amended) The method of displaying an image of claim 1 wherein the matrix liquid crystal display is an active matrix liquid crystal display [having a plurality of pixel electrodes,] including a counterelectrode panel and [an interposed] a layer of liquid crystal between the array of pixel electrodes and the counterelectrode panel.
6. (Amended) The method of displaying an image of claim 5 wherein the [step of] clearing the image from the display comprises [the step of] initializing the pixel electrodes to a set voltage.

7. (Amended) The method of displaying an image of claim 6 wherein the [flash] flashing ends a set time period after [the step of] initializing the pixel electrodes to a set voltage.
8. (Amended) The method of displaying an image of claim [1] 5 wherein the clearing of the image [is] includes varying the voltage of the counterelectrode.
9. (Amended) The method of displaying an image of claim 8 wherein the [flash] flashing ends a set time period after the [step of] varying [of] the voltage of the counterelectrode.
10. (Amended) A method of controlling a liquid crystal in a display comprising [the following steps]:
 - setting a voltage to each of at least 75,000 pixel electrodes connected to a respective transistor circuit of an array of transistor circuits formed in a first plane of an active matrix circuit with an active area of less than 20 mm²;
 - [providing an active matrix circuit having an array of transistor circuits formed in a first plane, each transistor circuit being connected to a pixel electrode in an array of pixel electrodes and] applying a voltage to a counterelectrode panel extending in a second plane that is parallel to the first plane[, such that the counterelectrode panel receives an applied voltage]; and
 - switching the applied voltage to the counterelectrode panel after [every] a subframe.
12. (Amended) A method of writing an image [to a liquid crystal display] comprising [the steps of]:
 - [providing an active matrix liquid crystal display having a plurality of pixel electrodes, a counterelectrode and a layer of liquid crystal;]
 - setting a voltage to each of at least 75,000 pixel electrodes of an active matrix liquid crystal display with an active area of less than 20 mm²;
 - allowing [the] a layer of liquid crystal positioned between the at least 75,000 pixel electrodes and a counterelectrode panel of the active matrix liquid crystal display to rotate towards an equilibrium;
 - flashing a backlight; and

initializing each of the pixel electrodes to a set voltage.

14. (Amended) The method of claim 12 further comprising [the steps of]:
 - repeating the setting, rotating, flashing and driving for each color subframe of the image; and
 - sensing the properties of the liquid crystal; and
 - heating the liquid crystal between frames [when required].
15. (Amended) The method of claim 12 further comprising [the step of] repeating the setting, rotating, flashing and driving for each color subframe of the image at a rate of over 165 subframes per second.
16. (Amended) The method of claim 13 further comprising [the steps of]:
 - repeating the setting, rotating, flashing and driving for each color subframe of the image at a rate of over 165 subframes per second; and
 - sensing the properties of the liquid crystal; and
 - heating the liquid crystal between frames [when required].
17. (Amended) The method of claim 16 further comprising [the steps of]:
 - [providing a portable display system having a housing carrying the liquid crystal display; and]
 - operating, at least at 15 MHz, a memory card reader located within [the] a portable housing for displaying video on the display from a memory card that docks with the card reader, the liquid crystal display mounted within the portable housing.
18. (Amended) The method of [a backlight] displaying an image of claim [1] 5 wherein the [step of] flashing [a backlight] the light source commences prior to [commencing of the step of] clearing the image from the display and wherein the [step of] clearing the image from the display comprises [the step of] varying the voltage to the counterelectrode and [the step of] initializing the pixel electrodes to a set voltage.